

Cat. No. 65-532

OWNER'S MANUAL

Please read before using this equipment.

Building Trades Calculator



RadioShack®

INTRODUCTION

The RadioShack Building Trades Calculator is part of a new generation of calculators. You can simplify difficult equations to the touch of a button. You can calculate pitch, cost, diagonals, and much more. The Building Trades Calculator can also convert metric units to English and vice versa. It's other features include:

Dedicated Fraction Keys — let you calculate based on common fraction denominators.

Triangle, Circle, Arc Calculation — let you solve for an unknown when certain values are given.

Density Calculation — lets you enter and display weight per volume (density).

© 1999 Tandy Corporation.

All Rights Reserved.

RadioShack is a registered trademark
used by Tandy Corporation.

Chain Logic — you can calculate successive intermediate operations without using brackets by pressing = to finalize an operation.

Temperature Conversion — lets you convert Fahrenheit to Celsius and vice versa.

Four-Function Memory Keys — lets you add to, subtract from, recall subtotals in, and clear all numbers from, memory.

Auto Power Off — To save battery power, the calculator automatically turns off after about 11 minutes after you stop using it.

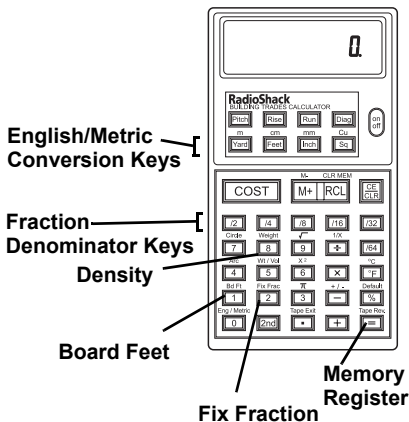
20-Step Memory Register — lets you review up to 20 entry steps and calculation results, as on a paper tape.

CONTENTS

A Quick Look at the Calculator	6
Operation	7
Turning the Calculator On	7
Basic Calculation Examples	7
Using the Memory Keys	8
Memory Example	9
Clearing Entries	10
Calculation Errors	11
Standard Function Keys	12
Memory Register	13
Using the Special Function Keys	14
Dimension Keys	17
Dimension Examples	23
Cost Calculations	27
Board Feet	29
Diagonal	30
Density	31
To Change the Density ...	32
Conversions	32
To Convert English to Metric	34

To Convert Decimal Units	34
To Convert Denominators	35
Area Conversions	36
Volume Conversions	36
Temperature Conversion	37
Circle Calculations	38
Circumference and Area	38
Arc Length	39
Volume	40
Density Calculations	41
Pitch, Rise, and Run	42
Care	45
Replacing the Battery	46
Resetting the Calculator	48
Specifications	49

A QUICK LOOK AT THE CALCULATOR



OPERATION

TURNING THE CALCULATOR ON

Press **on/off** to turn the calculator on and off. To save battery power, the calculator automatically turns off about 11 minutes after you stop using it. All previous entries and memory values are cleared when the calculator turns off.

BASIC CALCULATION EXAMPLES

You can perform basic calculations (addition, subtraction, multiplication, and division) with this calculator as you would with most other algebraic calculators. The following sections include examples of more advanced calculations.

USING THE MEMORY KEYS

The memory keys let you easily perform multi-step calculations.

To add a value to memory, enter the number or calculation you want to add, then press **M+**. The calculator totals the current memory calculation (if one is pending) and adds that value to memory. **M** appears when you press a memory key.

To subtract a value from memory, enter the number or calculation you want to subtract. Press **2nd**, then **M-**. The calculator totals the current memory calculation (if one is pending) and subtracts that value from memory.

To recall a value from memory, press **RCL** (memory recall), then press **M+**.

Note: You can use a number or calculation in the Register Memory as a memory operator. To use the quantity stored in the selected Memory Register, choose the operation desired and then press the **RCL** key followed by the desired data. See “Memory Register” on Page 13.

To clear the memory, press **2nd**, then **CLR/MEM** (clear memory) (**RCL**), or press **RCL** twice. **M** disappears.

Memory Example

You Press	You See
786 M+	M 786 .
432 2nd M-	M 432 .
2392 +	M 2392 .
576 ÷	M 2968 .

You Press	You See
RCL RCL	354 .
-	8.384181
73 =	-64.61582

CLEARING ENTRIES

*To clear an incorrect entry and continue the current calculation, press **CE/CLR** once so 0 . appears, then enter the correct value and continue your calculation.*

*To clear the display and begin a new calculation, press **CE/CLR** twice so 0 . appears.*

If you enter an incorrect operator key (+, −, ×, ÷) during a calculation, press the correct operator key and continue your calculation.

CALCULATION ERRORS

Error appears on the display when:

- A calculation result exceeds seven digits to the left of the decimal point.
- A memory calculation exceeds seven digits.
- You attempt to divide by 0.
- You attempt to calculate mixed units that are not alike (such as degrees and inches).
- You attempt to calculate the square root of a negative number.

To clear **Error** from the display, press **CE/CLR**.

Note: If you enter a number longer than seven digits in a calculation, or if a calculation results in a number longer than the seven digit range of the display, the answer will be rounded up.

STANDARD FUNCTION KEYS

+, −, ×, ÷ — Press to perform standard arithmetic operations.

= — Press to complete previously entered operations and show calculation results.

% — Press to find a given percentage of a number.

CE/CLR — Press once to clear the current entry. Press twice to clear the calculation. (Memory Register and default settings are not affected.)

MEMORY REGISTER

You can use the Memory Register to review up to 20 entry steps and calculation results, including the entered or calculated value, as well as the entry step number.

To view the Memory Register, press **CE/CLR** to clear the memory and the display. Enter the desired series of numbers and operators (for example, $2 + 3 + 4 - 6 + 7 =$). Press **2nd**, then **Tape Rev.** to review the tape. **Tape** appears as well as the step number (in the example above, **06**).

You can scroll through the steps by pressing **+** or **-**. After each step number, the operator appears, indicating which mathematical operation occurred in that step.

To exit the Memory Register at any time, press **2nd**, then **Tape Exit**.

USING THE SPECIAL FUNCTION KEYS

2nd — Activates the second function for designated keys.

COST — Press to calculate the cost of building materials when the base price is known.

Pitch, **Rise**, and **Run** — use these keys when calculating the pitch, rise, and run of a roof, for example.

Diag — Press to calculate the diagonal of a triangle.

Yard (m) — Converts yards to meters, and vice versa.

Feet (cm) — Converts feet to centimeters, and vice versa.

Inch (mm) — Converts inches to millimeters, and vice versa.

Sq (Cu) — Press to enter squared or cubed units.

Default — Restores the calculator's default settings.

Eng/Metric (0) — Converts English units to metric units, and vice versa. It also allows you to enter a series of metric values without having to repeatedly press **2nd**. **Metric** appears when the calculator is using metric

units. To return to English units, press **2nd Eng/Metric** again.

Tape Rev. (=) — Press to access the Memory Register. **Tape** and the arithmetic step number appear. Press **2nd Tape Exit (.)** to exit the Memory Register.

Wt/Vol (5) — Press to calculate density.

Weight (8) — Used to calculate the total weight of a volume of material.

+/- (-) — Changes the displayed value from positive to negative, and vice versa.

1/x (÷) — Divides the number 1 by the number shown on the display.

π — Inserts the value of Pi (3.141592).

$\sqrt{}$ — Calculates the square root of a number.

x^2 — Calculates the square of a number.

Dedicated Fraction Keys — Let you perform calculations in fractions of inches. When entering fractions, enter the numerator then press the dedicated denominator key.

DIMENSION KEYS

Use the dimension keys when working with three-dimensional objects and also to convert between English and metric units. When entering dimensional values, always enter the largest dimension first (enter feet before inches, for example).

Yard (m) — Press to enter yard measurements or to convert yards to meters.

Feet (cm) — Press to enter feet measurements or to convert feet to centimeters. You can use decimal numerals. Press **Feet** again to see the decimal numeral expressed in feet and inches.

Inch (mm) — Press to enter inch measurements or to convert inches to millimeters. Enter the desired number (in either fractions or decimals). Press **Inch** again to toggle between the fraction and decimal view.

/2, /4, /8, /16, /32, /64 — (Fraction Inch Denominator keys) Press to enter the desired denominator.

m (Yard) — Press to enter meter measurements or to convert meters to yards.

cm (Feet) — Press to enter centimeter measurements or to convert centimeters to feet.

mm (Inch) — Press to enter millimeter measurements or to convert millimeters to inches.

Sq (Cu) — Press to enter square units. (Press before you press the units key.)

Example: To enter 5 ft²:

You Press	You See
5 Sq Feet	SQFt 5.

Cu (Sq) — Press to enter cubed units. (Press before you press the units key.)

Bd Ft (1) — Press to enter measurements in board feet or to convert measurements to/from board feet. (A

board foot is a cubic measurement of lumber 1 foot square by 1 inch thick.)

Circle (7) — Press to find the circumference and area of a circle (where the diameter is known). Enter the diameter and press **Circle** twice to find the circumference (**CIRC**). Press **Circle** again to find the area (**AREA**).

Arc (4) — Press to find the length of an arc after you enter the diameter and angle.

Fix Fraction (2) — Use **Fix Fraction** when you want an answer to be expressed in the selected fraction denominator, rather than the least common denominator. **FIX** flashes when you select **Fix Fraction**.

Example: $\frac{3}{16} + \frac{5}{16} = \frac{8}{16}$

You Press	You See
2nd Fix Frac /16 = 3 /16 + 5 /16 =	FIX 0 $\frac{8}{16}$ INCH

Reduced Fraction is the default setting for the calculator. The calculator automatically reduces a fractional answer to a fraction with the least common denominator.

Example: $\frac{3}{16} + \frac{5}{16} = \frac{1}{2}$

You Press	You See
3 /16 + 5 /16 =	0 $\frac{1}{2}$ INCH

Pitch — Press to calculate the pitch (slope) of a right triangle. Repeatedly press **Pitch** to cycle through angle (in degrees), ratio (in fraction of inches), and rise (in decimals). The calculator keeps the entry in memory until you replace it or turn off the calculator.

Run — Press to calculate the run of a triangle. To calculate the run, first enter any two of the following: rise, pitch, or diagonal (length).

Rise — Press to calculate the rise of a triangle. To calculate the rise, you must enter any two of the following: run, pitch, or diagonal (length).

Diag (Diagonal Length) — Press to calculate the diagonal of a triangle. To calculate the length, you must enter any two of the following: rise, run, or pitch.

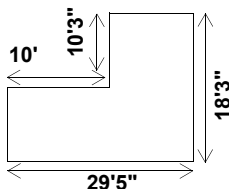
Dimension Examples

Given a string of dimensions in feet, inches, and fractions, find the total:

$$5 \text{ ft } 7 \text{ in} + 6 \text{ ft } 9\frac{1}{16} \text{ in} =$$

You Press	You See
5 Feet 7 Inch + 6 Feet 9 Inch 1 /16 =	12 Ft 4 $\frac{1}{16}$ INCH

Find the area of an L-shaped room when the depth is unknown.

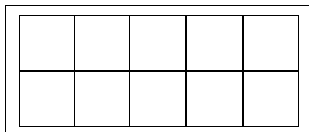


You Press	You See
2nd CLR MEM	0.
18 Feet 3 Inch × 29 Feet 5 Inch =	536.8542 SQFt
M+	536.8542 M SQFt
10 Feet × 10 Feet 3 Inch =	102.5 M SQFt
2nd M–	102.5 M SQFt
*RCL RCL	434.3542 SQFt

* Only press **RCL RCL** if you no longer need to keep the calculation or number in memory; otherwise, press **RCL M+** to recall the number or calculation while *also* keeping it in memory.

Given five windows, each 2 ft $11\frac{7}{16}$ in wide, find their overall width if they are placed side by side in a wall.

Window Width = 2' $11\frac{7}{16}$ "



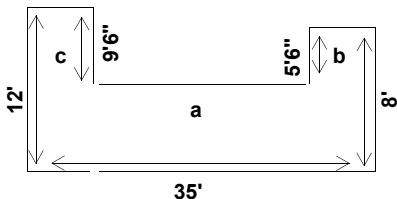
You Press	You See
2 Feet $11\frac{7}{16} \times 5 =$	14 Ft $9\frac{3}{16}$ INCH

Given 8 ft 10³/₄ in for a floor-to-floor dimension, how many 8-inch-high risers will be required? What is the exact height of each riser?

You Press	You See
2nd RCL	0.
8 Feet 10 Inch 3 /4 M+	M 8 Ft 10 3/4 INCH
÷ 8 Inch =	M 13.34375
RCL RCL ÷ 13 =	0 Ft 8 7/32 INCH
2nd /16	0 Ft 8 3/16 INCH

COST CALCULATIONS

Find the cost of concrete for this courtyard, when the concrete costs \$50.00 per cubic yard:



35'
Given: walkway width is 30"
Depth of walkway is 4"

**Area of
a**

You Press	You See
2nd RCL	0 .
35 Feet \times 30 Inch = M+	M 87.5 SQFt



	You Press	You See
Area of b	5 Feet 6 Inch \times 30 Inch = M+	M 13.75 SQFt
Area of c	9 Feet 6 Inch \times 30 Inch = M+	M 23.75 SQFt
Total Area	RCL RCL	125. SQFt
Times Depth	\times 4 Inch =	41.66667 CU Ft
Find Cubic Yards	Yard	1.54321 CU Yd
Find Cost	\times 50 COST	\$77.16

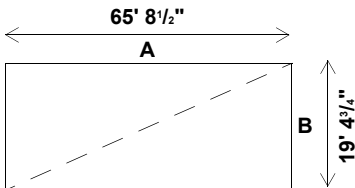
Board Feet

Find the total cost for eight 2-inch \times 4-inch \times 18-foot boards of lumber, given the unit price is \$1.60/Bd Ft:

You Press	You See
2 \times 4 \times 18 2nd Bd Ft	12 . B Ft
$\times 8 =$	96 . B Ft
$\times 1.6$ COST	\$153 . 60

DIAGONAL

Calculate the diagonal of the rectangle, where A and B are given:



You Press	You See
65 Feet 8 Inch 1 / 2 Run	RUN 65 Ft 8 1 / 2 INCH
19 Feet 4 Inch 3 / 4 Rise	RISE 19 Ft 4 3 / 4 INCH
Diag	DIAG 68 Ft 6 9 / 64 INCH
2nd /16	DIAG 68 Ft 6 2 / 16 INCH

DENSITY

Use **Wt/Vol** to enter and display weight per volume (density). When using English units, the density is entered as *tons per cubic yard* or *pounds per cubic yard*; when using metric units, the density is entered as *kilograms per cubic meter*.

To display density, press **2nd**, then **Wt/Vol**. The calculator cycles through the three density units — tons per cubic yard (**Tn/CU Yd**), pounds per cubic yard (**LB/CU Yd**), and kilograms per cubic meter (**KG/CU M**).

The calculator's default setting is 1.5 tons per cubic yard (3000 pounds per cubic yard, 1,779.829 kilograms per cubic meter).

To Change the Density

You Press	You See
2nd Wt/Vol.	1.5 Tn/CU Yd
2 . 0 2nd Wt/ Vol.	2. Tn/CU Yd
CE/CLR	0.
2nd Wt/Vol.	2. Tn/CU Yd
Wt/Vol.	4000. LB/CU Yd
Wt/Vol.	2373.106 KG/CU M

CONVERSIONS

The calculator can convert between different English units, different metric units, and between English and metric units.

Note: If an operation is performed with mixed units, your calculator will automatically convert the result to the units you first entered.

To convert English units to metric (and vice versa), enter the desired amount and unit (**Feet**, for example), then press the desired unit to convert to (**mm**, for example).

To convert between English or metric units, enter the desired amount, press the larger unit (**m**, for example), then press the smaller unit (**mm**, for example). Conversion between metric units requires the use of **2nd** and secondary function keys.

To Convert English to Metric

To Convert	You Press	You See
1 yard	1 Yard	1 Yd
to feet	Feet	3 Ft
to inches	Inch	36 Inch
to centime- ters	2nd Feet	91 . 44 cm

To Convert Decimal Units

To Convert	You Press	You See
1.6 feet	1.6 Feet	1 . 6 Ft
to inches	Feet	1Ft 7 13 64 INCH

To Convert	You Press	You See
to centime- ters	2nd Feet	48 . 768 CM

To Convert Denominators

You can change the denominator used in an entry. Simply press **2nd** then the desired new denominator key.

To Convert	You Press	You See
$\frac{7}{32}$ inch	7 /32	0 $\frac{7}{32}$ INCH
to /16 inches	2nd /16	0 $\frac{4}{16}$ INCH

Area Conversions

To Convert	You Press	You See
10 square feet	10 Sq Ft	10 SQFT
to square meters	2nd m	0.92903 SQ M
to square centimeters	2nd cm	9290.30 4 SQ CM

Volume Conversions

To Convert	You Press	You See
10 cubic meters	10 2nd Cu 2nd m	10 CU M

To Convert	You Press	You See
to cubic feet	Feet	353.146 7 CU Ft
to cubic inches	Inch	610237. 4 CU INCH

Temperature Conversion

To Convert	You Press	You See
104°F	104 °F	104 °F
to Celsius	2nd °C	40 °C

CIRCLE CALCULATIONS

Circumference and Area

Find the circumference and the area of a circle with a diameter of 10 inches.

You Press	You See
10 Inch 2nd Circle	DIA 10 INCH
Circle	CIRC 31 $\frac{27}{64}$ INCH
Circle	AREA 78.53982 SQ INCH

Arc Length

Find the arc length of an 85° arc with a diameter of 5 inches.

You Press	You See
5 Inch 2nd Circle	DIA 5 INCH
85 2nd Arc	ARC 3 $\frac{45}{64}$ INCH
Inch	3.708825 INCH

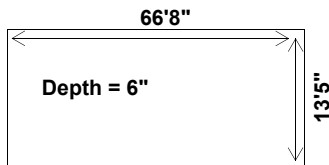
Volume

Determine how much cement is needed to pour 5 concrete footings that have an 8 inch diameter and are 12 inches deep.

You Press	You See
8 Inch 2nd Circle	DIA 8 INCH
Circle Circle	AREA 50.26548 SQ INCH
× 12 Inch =	603.1858 CU INCH
× 5 =	3015.929 CU INCH
Feet	1.745329 CU Ft

DENSITY CALCULATIONS

Determine the weight and volume for a concrete patio with the given dimensions.



You Press	You See
2nd Default	0 .
66 Feet 8 Inch x 13 Feet 5 Inch x 6 Inch =	447.2222 CU Ft
Yard	16.56379 CU Yd

You Press	You See
2nd Weight	24.84568 Tn

PITCH, RISE, AND RUN

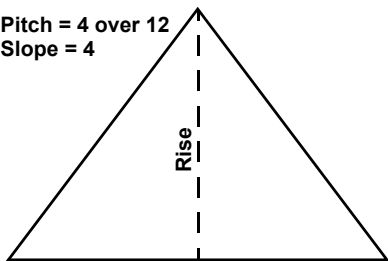
Given any two — pitch, rise, run, or diagonal — solve for the other two.

This is a useful calculation in determining wall heights.

Find the rise of a roof, given the pitch of 4 ft 12 in, and the run of 13 ft $2\frac{3}{8}$ in.

Remember: The pitch of a roof equals its rise in inches over a run of 12 inches. A 4/12 roof has a slope of 4 inches. (When entering slope, always use inches.) In metric units, pitch is expressed in millimeters over 1,000 millimeters of run.

Pitch = 4 over 12
Slope = 4



Run = 13' 2³/₈"

You Press	You See
4 Inch Pitch	PTCH 4 INCH
13 Feet 2 Inch 3 / 8 Run	RUN 13 Ft 2 ³ / ₈ INCH
Rise	RISE 4 Ft 4 ⁵¹ / ₆₄ INCH
Diag	DIAG 13 Ft 10 ¹⁵ / ₁₆ INCH
Pitch	PTCH 4 INCH



You Press	You See
Pitch	PTCH 0.333333
Pitch	PTCH 18.43495°

CARE

To enjoy your Building Trades Calculator for a long time:

- Keep the calculator dry. If it gets wet, wipe it dry immediately.
- Use and store the calculator only in normal temperature environments.
- Handle the calculator gently and carefully. Don't drop it.
- Keep the calculator away from dust and dirt.
- Wipe the calculator with a damp cloth occasionally to keep it looking new.

Modifying or tampering with the calculator's internal components can cause a malfunction and invalidate its warranty. If your calculator is not performing as it should, take it to your local RadioShack store for assistance.

REPLACING THE BATTERY

The calculator comes with a CR2016 lithium battery installed for power. When the display slows down or dims, replace the battery. For the best performance and longest life, we recommend a RadioShack battery.

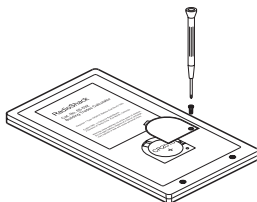
Warnings:

- Keep button-cell batteries away from children. Swallowing a button-cell battery can be fatal.
- Dispose of an old battery promptly and properly. Do not burn or bury it.

Caution: Use only a fresh battery of the required size and recommended type.

Follow these steps to replace the battery.

1. Press **on/off** to turn off power.
2. Use a Phillips screwdriver to remove the screw from the battery compartment and slide the cover off.



Caution: Before removing the battery, be sure to touch a metal object to avoid any accidental discharge of static electricity (which may harm the circuit board).

-
3. Remove the old battery and place the new battery with its positive (+) side facing up.
 4. Replace the cover and secure it with the screw.

RESETTING THE CALCULATOR

If the display dims or the calculator stops operating properly, reset it by using a sharp object (such as a straightened paperclip) to press **RESET**. Resetting the calculator erases the memory and the Memory Register.

SPECIFICATIONS

Display 7-digit with Fraction

Operating Temperature: 32° to 122°F
(0° to 50°C)

Power Supply One 3V Lithium
Battery CR2016

Battery Life about 1 Year

Dimensions (HWD):

With protective cover:

$5\frac{3}{8} \times 3\frac{1}{8} \times \frac{2}{3}$ in
(137 × 79 × 17 mm)

Without protective cover:

$5\frac{1}{4} \times 2\frac{15}{16} \times \frac{3}{8}$ in
(134 × 74 × 10 mm)

Weight:

With protective cover: 3.9 oz
(110 g)

Without protective cover: 2.8 oz
(80 g)

Specifications are typical; individual units might vary. Specifications are subject to change and improvements without notice.

NOTES

Limited One-Year Warranty

This product is warranted by RadioShack against manufacturing defects in material and workmanship under normal use for one (1) year from the date of purchase from RadioShack company-owned stores and authorized RadioShack franchisees and dealers. EXCEPT AS PROVIDED HEREIN, RadioShack MAKES NO EXPRESS WARRANTIES AND ANY IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE DURATION OF THE WRITTEN LIMITED WARRANTIES CONTAINED HEREIN. EXCEPT AS PROVIDED HEREIN, RadioShack SHALL HAVE NO LIABILITY OR RESPONSIBILITY TO CUSTOMER OR ANY OTHER PERSON OR ENTITY WITH RESPECT TO ANY LIABILITY, LOSS OR DAMAGE CAUSED DIRECTLY OR INDIRECTLY BY USE OR PERFORMANCE OF THE PRODUCT OR ARISING OUT OF ANY BREACH OF THIS WARRANTY, INCLUDING, BUT NOT LIMITED TO, ANY DAMAGES RESULTING FROM INCONVENIENCE, LOSS OF TIME, DATA, PROPERTY, REVENUE, OR PROFIT OR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, EVEN IF RadioShack HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Some states do not allow the limitations on how long an implied warranty lasts or the exclusion of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

In the event of a product defect during the warranty period, take the product and the RadioShack sales receipt as proof of purchase date to any RadioShack store. RadioShack will, at its option, unless otherwise provided by law: (a) correct the defect by product repair without charge for parts and labor; (b) replace the product with one of the same or similar design; or (c) refund the purchase price. All replaced parts and products, and products on which a refund is made, become the property of RadioShack. New or reconditioned parts and products may be used in the performance of warranty service. Repaired or replaced parts and products are warranted for the remainder of the original warranty period. You will be charged for repair or replacement of the product made after the expiration of the warranty period.

This warranty does not cover: (a) damage or failure caused by or attributable to acts of God, abuse, accident, misuse, improper or abnormal usage, failure to follow instructions, improper installation or maintenance, alteration, lightning or other incidence of excess voltage or current; (b) any repairs other than those provided by a RadioShack Authorized Service Facility; (c) consumables such as fuses or batteries; (d) cosmetic damage; (e) transportation, shipping or insurance costs; or (f) costs of product removal, installation, set-up service adjustment or reinstallation.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

RadioShack Customer Relations,
200 Taylor Street, 6th Floor, Fort Worth, TX 76102

We Service What We Sell

04/99